



Glass for marine applications

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How are photovoltaic and concentrated solar energy performing?



Photovoltaic and solar thermal energy are the two sources of clean energy that make the greatest use of glass. The first is a mature technology, the second still in its infancy. Both are the best answer to the growing energy requirements of the world which urgently needs to reduce its

dependence on fossil fuels.



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Although this may not seem possible given the plummeting price of fossil fuels, the sun remains the most promising source of energy for the immediate future. One could even say for the present, especially if photovoltaic energy is considered. Figures recently published by the International Energy Agency have demonstrated for example that European countries rank first worldwide in terms of the percentage of photovoltaic energy in national electricity demand and that among these Italy is first at 7.5%, followed by Germany at about 7% and Spain at a distance with 3%. In the rest of the world (figures for 2014) photovoltaic energy covered more than 1% of global energy needs. A percentage that the agency itself indicated as being a significant development, exceeding the highest expectations.



If we look at figures on the increase in installations in Italy, there's a significant slowdown, while the rest of the world is growing strongly mainly due to the increasingly higher competitiveness of next generation panels, which are often much more cost-effective than coal for example. In 2014, total power capacity in the world totaled 180 gigawatt, up by 40 gigawatt: in comparison, total installed power is 18.5 gigawatt, up by 400 megawatt. The global increase for 2015 is tipped to be 54 gigawatt, 35% more than the previous year. This phenomenon is even more interesting if one considers that emerging countries account for the lion's share: in 2012 Europe accounted for 59% of the new installations, in 2014 Asia had 60% versus 18% in Europe. China, Japan and the United States are the largest contributors but this growth can be found throughout the new markets. For a simple reason: the price of photovoltaic energy is falling sharply, as shown by the trends in the auctions called by the public utilities of non-European and European countries.



The situation is more complex for concentrated solar power (CSP), a technology that is still in full development since it has not reached the maturity of photovoltaic energy yet. At present there are only about 50 solar power plants, 30 of these are in Spain and the others in the United States, North Africa and China. Solar energy is converted into thermal energy by reflecting sunlight onto a dedicated receiver using special mirrors. The technologies used are quite different, however systems with linear parabolic troughs are the most common, with rows of mirrors rotating on an axis that concentrate sunlight on a receiving tube containing a thermovector fluid which transforms heat into steam and generates electricity through a turbine. There are also tower plants, where the array of mirrors on the ground reflect and concentrate sunlight on a fixed receiver, positioned at the top of the tower. The world's largest solar power plant is now under construction in California's Mojave desert. Concentrated solar power plants currently have a maximum 5 gigawatt power capacity but are nonetheless considered among the most promising sources of clean energy because they are just at the beginning of their development.

Commenting on this, Pietro Ungarelli, head of R&D at **Fenzi** which produces the most leading-edge paints for solar mirrors in the world, stated: "The falling price of oil has temporarily decreased interest in this technology, which is really very interesting however. At present there is a good production of solar mirrors in South Africa, but it is mainly in China where large-scale projects are about to take off. Concentrated solar power is definitely the technology of the future"

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